Exhibit 13

UNITED STATES DISTRICT COURT
SOUTHERN DISTRICT OF NEW YORK

SECURITIES AND EXCHANGE COMMISSION, Plaintiff, *-against-* **RIPPLE LABS, INC., BRADLEY GARLINGHOUSE, and CHRISTIAN A. LARSEN**, Defendants.	Case No. 20-CV-10832 (AT)

Supplemental Report of Allen Ferrell, Ph.D.

May 13, 2022

Table of Contents

I. ASSIGNMENT AND SUMMARY OF OPINIONS

1. My qualifications and compensation are described in the previous expert reports I have submitted in this matter.[1] The materials I have considered are listed in Appendix B.

2. I have been asked by counsel for Ripple to review, and respond to, the Supplemental Expert Report of Dr. [redacted] of February 28, 2022 (hereinafter "[redacted] Supplemental Report").

3. Dr. [redacted] now claims that "but-for the news and public statements related to Ripple to which XRP prices reacted in a statistically significant way, the USD price per XRP token would have rarely exceeded $0.02."[2] In support of this, the [redacted] Supplemental Report presents so-called but-for counterfactual XRP prices – the prices that supposedly would have obtained absent news about Ripple – which are then compared to actual XRP prices over the May 5, 2014 – October 28, 2020 period ("[redacted] Time Period").[3] Dr. [redacted] claims that, absent the cumulative effect of news concerning Ripple over this entire time period, as of October 28, 2020 the but-for counterfactual XRP price would have been $0.000284[4] compared to the actual XRP price of $0.246. In other words, according to Dr. [redacted] virtually the entire price of XRP as of October 28, 2020 was a function of the previous news and public statements related to Ripple.

---

[1] My updated CV is attached hereto as Appendix A. *See also,* Expert Report of Allen F. Ferrell, October 4, 2021 (hereinafter, "Ferrell Report"); Rebuttal Expert Report of Allen F. Ferrell, November 12, 2021.

[2] *See, e.g.*, [redacted] Supplemental Report ¶ 9. S*ee also id.*, ¶¶ 10-19. On a related note, Dr. [redacted] further claims that "purchasing XRP before the release of the news and public statements related to Ripple on the 100 Event Days would have resulted in greater investment returns than purchasing at other times." [redacted] Supplemental Report ¶ 9.

[3] The [redacted] Supplemental Report presents these results using his Model 1 (the "Constant Mean-Return" Model) in his Figures 2 & 4 ("Actual versus Counterfactual XRP Prices") and some summary data with respect to all 20 of his models in Figures 3 and 5 ("Counterfactual XRP Price Summary").

[4] Counterfactual prices per Dr. [redacted] Model 1. Counterfactual prices for Dr. [redacted] other models are similarly trivial.

In short, Dr. [redacted] theory is one of a substantial Ripple-specific positive price return (what is referred to in finance as "alpha").[5] This is demonstrably incorrect, as I showed in my opening report and will demonstrate below.

4. I will begin by noting three aspects of Dr. [redacted] new claims. First, in his supplemental opinion, Dr. [redacted] attempts to draw an economic inference from his but-for, counterfactual XRP pricing over the entire [redacted] Time Period. By contrast, in his original expert report, Dr. [redacted] offered a far more limited opinion: he purported to simply reject the null hypothesis of the independence of Ripple news and XRP price movements based on very short-term (one-day, two-day, and three-day event window) correlations.[6] Dr. [redacted] original decision to confine his claims to refuting this null hypothesis, based on short-term correlations, was a wise one given the obvious concern about the efficiency of the XRP market. Short-term correlations in an inefficient market can be just that: short-term correlations that amount to no more than transitory blips with no longer term implications for pricing. In fact, Dr. [redacted] presented evidence in his original report indicating that the XRP market is *not* efficient during the [redacted] Time Period.[7]

5. Second, on a related note, the [redacted] Supplemental Report presents and makes no new claims concerning the efficiency of the XRP market even though he is extrapolating his very

[5] All of which, once again, makes Dr. [redacted] objection in his rebuttal report to my testing of whether there was an alpha associated with XRP incoherent.

[6] I am not endorsing Dr. [redacted] use of event studies in his Supplemental Report or in the Expert Report of [redacted] Ph.D., October 4, 2021 (hereinafter "[redacted] Report").

[7] *See, e.g.*, [redacted] Report, Appendix F, ¶ 6 ("For both positive and negative autocorrelation, there are periods where such autocorrelation is statistically significant. During these periods, I can reject the hypothesis that XRP prices are even weak form efficient."). In Appendix F, ¶ 4, Footnote 4, Dr. [redacted] also cites the paper Andrew Urquhart, "The Inefficiency of Bitcoin," *Economics Letters* Vol. 148, 2016 ("Since [Bitcoin] is a relatively new investment asset and still in its infancy, it is similar to an emerging market and therefore the inefficiency finding is not surprising."). Dr. [redacted] testified in his deposition that: "The received evidence and the economic literature, consistent with my own analysis, is that the XRP digital token market was likely not semi-strong efficient during the period of interest." Videotaped Deposition of [redacted] Ph.D., February 18, 2022 at 93:23 – 94:3.

short-term correlations over a six year plus period. He is simply silent on the issue of market efficiency.

6. Third, the [redacted] Supplemental Report presents no statistical analysis whatsoever as to whether his claims concerning the estimated long-term price impact extrapolated from his short-term correlations is accurate. Yet again, Dr. [redacted] is notably simply silent on the issue.

7. In fact, as I will now document, Dr. [redacted] but-for, counterfactual prices based on extrapolating his short-term correlations are implausible on their face, inconsistent with the empirical evidence and, remarkably, attributes price impacts to news about Ripple on days that he himself identifies as *not* having any news about Ripple (i.e., days on which there are no "Ripple Events" or "Event Days" as he labels them).[8] In short, his extrapolation of short-term correlations over a six year plus period is fundamentally flawed and obviously so as I show next.

II. THE METHODOLOGY DR. [redacted] USES TO CONSTRUCT HIS COUNTERFACTUAL PRICE IS FLAWED AND SUBSTANTIALLY AFFECTS PRICES ON NON-EVENT DAYS

8. The [redacted] Supplemental Report states:

> For the purposes of the analysis presented below, I begin with the 113 events on 105 unique days represented by the Select Categories analysis in the [redacted] Report. To be conservative, I remove from that set 5 instances of Digital Asset Trading Platform Listings which I could not definitively attribute to the efforts of Ripple Labs based on the set of news I analyzed. The final set of events I study below thus numbers 108 events on 100 unique days. I will refer to these as the "Ripple Events" and the "Event Days," respectively.[9]

In other words, "Event Days" are days that Dr. [redacted] has identified as days on which there was news concerning Ripple whereas non-Event Days are days for which there is no news concerning Ripple. His event study purports to measure the XRP price reaction on "Event Days."

---

[8] *See, e.g.*, [redacted] Supplemental Report, ¶¶ 8, 10, and 15.

[9] *See, e.g.*, [redacted] Supplemental Report, ¶ 8.

9. Dr. [redacted] explains that that his counterfactual prices represent the XRP price but-for Ripple news.[10] In other words, the difference between the actual XRP price and the but-for counterfactual price represents his quantification of the price impact of Ripple news. Despite this, Dr. [redacted] but-for counterfactual prices consistently attribute XRP price reactions to news concerning Ripple on non-Event Days. This leads to nonsensical results. For instance, Dr. [redacted] counterfactual prices remarkably shows a price impact of $0.775 (approximately 35 percent of XRP's actual price on that date) on December 29, 2017. But there was no Ripple news on this date according to Dr. [redacted] himself.[11] More generally, he finds a purported price impact associated with Ripple news on 1,909 days during the [redacted] Time Period (when extrapolating from his Model 1 event study) but he identifies a mere 23 Ripple Events.[12]

10. The nonsensical result of attributing XRP price reactions to Ripple news on non-Event Days is a fundamental feature of Dr. [redacted] methodology of mixing returns and but-for counterfactual prices over the [redacted] Time Period.[13] Consider the following illustrative example of [redacted] methodology. Suppose there is a 100% return on an event day such that XRP price increases from $0.25 to $0.50 and, furthermore, suppose that the predicted return on this day is 0%. Dr. [redacted] would replace the 100% return with his predicted return, i.e., 0%, and the counterfactual price at the end of the event day would therefore remain at $0.25. The difference between the actual and counterfactual price is therefore $0.25 at this point. Also suppose there is a 50% return on the following non-event day (with XRP price increasing from $0.50 to $0.75).[14]

[10] *See, e.g.*, [redacted] Supplemental Report, ¶¶ 9, 11 and 16.

[11] Nor does December 29, 2017 fall within a two or three day window that includes an "Event Day."

[12] [redacted] Supplemental Report, ¶ 9, ("when the abnormal returns associated with the 23 statistically significant Ripple Events are removed […].").

[13] *See, e.g.*, [redacted] Supplemental Report, ¶ 12.

[14] This is assuming that Dr. [redacted] conditional for substituting the cumulative returns with predicted return does not hold. *See*, Supplemental Report, ¶ 12.

On the non-event day, the counterfactual price would go up by the actual return of 50%, i.e., from $0.25 to $0.375. The difference between the actual and counterfactual price has now grown from $0.25 ($0.50 - $0.25) to $0.375 ($0.75 – $0.375), a 50% increase on a non-event day.

11. Exhibit 1 sets forth information from Dr. [redacted] own but-for counterfactual prices identified in his Model 1.[15] Exhibit 1 identifies the 10 days with the largest price impact associated with Ripple news according to Dr. [redacted] occurring on [redacted] *Non-Event Days* (top panel) and, as a point of comparison, the 10 days with the largest price impact occurring on [redacted] *Event Days* (bottom panel).

12. Most importantly, the top panel, that is the [redacted] *Non-Event Days*, shows that on these days Dr. [redacted] is estimating large price impacts due to news about Ripple even though according to Dr. [redacted] himself these are not "Event Days." Indeed, these price impacts are often larger than those associated with actual [redacted] *Event Days* when Ripple news was released according to Dr. [redacted] as one can see comparing the top panel to the bottom panel. The same results – large price impacts attributed to Ripple news on non-Event Days – are also identified by Dr. [redacted] other 19 models and their associated but-for counterfactual prices.[16]

13. Needless to say, this makes no economic sense. Dr. [redacted] methodology increases the pricing impact of news about Ripple on days that he himself as identified as non-news days.

[15] Counterfactual prices calculated by Dr. [redacted] using his Model 1. *See, e.g.*, [redacted] Supplemental Report, ¶ 9.

[16] The maximum price impact on the [redacted] *Non-Event Days* across Dr. [redacted] 20 models varies between $0.78 and $0.75 compared to a range of the maximum price impact between $0.41 and $0.15 on [redacted] *Event Days*. Similar results hold when using Dr. [redacted] one-day application. *See, e.g.*, [redacted] Supplemental Report, Figure 5.

III. DR. [redacted] COUNTERFACTUAL PRICES ARE INCONSISTENT WITH THE EMPIRICAL EVIDENCE

14. During the [redacted] Time Period, Bitcoin rose by 2,962% and Ether, which started trading on August 7, 2015, rose by an astonishing 13,920% by the end of the [redacted] Time Period. These are two cryptocurrencies that Dr. [redacted] himself compares to XRP.[17] In comparison, XRP rose 4,616% in the [redacted] Time Period. Nevertheless, Dr. [redacted] claims that XRP would have fallen by 95% in the absence of news concerning Ripple.[18] This is implausible and is, in fact, incorrect as I will now show.

15. More formally, Dr. [redacted] but-for counterfactual XRP prices mathematically imply an average excess 28-day return associated with news about Ripple. For instance, according to his Model 1, the difference between the actual XRP price and the but-for counterfactual price as of October 28, 2020, the end of the [redacted] Time Period, is $0.24562 ($0.24659 - $0.000284). This number – $0.24562 – supposedly reflects the cumulative price impact of news related to Ripple over the [redacted] Time Period (some 77 months). Mathematically this implies an average 28-day excess return (a return above and beyond what one would expect from general movements in the cryptocurrency markets) due to news about Ripple of 19.2%.[19] As the [redacted] Supplemental Report uses 20 models, there are 20 associated implied average

[17] *See, e.g.*, [redacted] Report, ¶ 12. See also, ¶ 114 ("As discussed below, I also find that during the period from 2014 to the end of 2020, XRP returns are correlated with Bitcoin returns, although the magnitude of that correlation fluctuates over time. More importantly, XRP returns can only be partially explained by BTC returns, and sometimes are explained more by ETH returns.").

[18] Dr. [redacted] counterfactual XRP price on October 28, 2020 is $0.000284 and on May 25, 2015 it is $ 0.00693. See, Backup to [redacted] Supplemental Report.

[19] For each 28-day period in the [redacted] Time Period, I calculate the 28-day excess return, the difference between the actual XRP return and Dr. [redacted] but-for return, calculated using his daily counterfactual prices. The reported number is the average of the 28-day excess returns.

excess 28-day excess returns ("[redacted] Excess Returns"). The 28-day [redacted] Excess Returns vary between 11.03% and 23.2%.[20]

16. Fortunately, there is a standard approach to assess whether there is in fact an average excess return over a given time-period: a factor model. As I explained in my original report, factor models are supported by more than 50 years of rigorous, academic research[21] and have been applied to cryptocurrencies among many other assets.[22] Factor models identify whether or not there is an average excess return regardless of whether or not the market is efficient.[23] In my original report I presented a factor model using data from other cryptocurrencies as my explanatory factors. I ran my factor model over two time periods: August 6, 2013 – December, 2020 (Estimation Period 1) and August 11 2015 – December 20, 2020 (Estimation Period 2). My Estimation Period 2 model had an adjusted-R square – the explanatory power of the model in explaining XRP price movements – of 92.3% and utilized some 91 cryptocurrencies (including Ether which started trading on August 7, 2015, a few days before my Estimation Period 2) as I show in Exhibit 2.

17. For 18 of Dr. [redacted] 20 models, the counterfactual price is equal to the actual prices on every day before August 2015. In other words, according to Dr. [redacted] there is no impact on prices associated with the news related to Ripple prior to August, 2015 for these models, including Model 1 which he discusses and presents in Figures 2 and 4 of the [redacted]

[20] I multiply the 28-day average [redacted] Excess Return for the period ending October 28, 2020 by (68/70) to extend the results to December 20, 2020 (the end date of my analysis period). *See*, Ferrell Report, ¶ 169. All the results hold if I simply end my factor model on November 3 (the first Tuesday after October 28, 2020).

[21] *See e.g.*, Ferrell Report, ¶ 91.

[22] *See, e.g.*, Ferrell Report, ¶ 91 and Footnote 154.

[23] *See, e.g.*, L. A. Bebchuk, A. Cohen, C. C. Y. Wang, "Learning and the Disappearing Association Between Governance and Returns," *Journal of Financial Economics*, 108 (2013), at 323-348 (using factor models to measure alpha over multiple years when the market, according to the authors, does not quickly price public information concerning corporate governance).

Supplemental Report.[24] I therefore will use my Estimation Period 2 factor model which I have already developed and presented in my original report in assessing the [redacted] Excess Returns. As I will now show, the statistical evidence is inconsistent with the existence of the [redacted] Excess Returns.

18. I compare the 28-day [redacted] Excess Returns for Estimation Period 2 to the 95% confidence interval for the regression constant in my factor model.[25] The regression constant or "alpha" is the "abnormal return in excess of what could have been achieved by passive investments in the factors."[26] Exhibit 2 shows that the *true* value of the excess return (regression constant) is within -10.3% and 6.0% with a 95% probability.[27] *None* of the 28-day average [redacted] Excess Returns are within the 95% confidence interval of the factor model for any of Dr. [redacted] 20 models as I show in Exhibit 3. In other words, if the [redacted] Excess Returns existed, they would have been identified by the factor model as such in the form of a statistically significant alpha. But the alpha is not statistically significant.[28]

[24] Furthermore, Dr. [redacted] finds a statistically significant abnormal return on an Event Day for only 2 of his 20 models prior to August, 2015, the purported cumulative price impact for these before August 2015 for these two models are only 0.6% out of the purported total cumulative pricing impact of news about Ripple.

[25] For excess returns within the 95% confidence interval, I cannot reject the null hypothesis of the constant term equals zero at the 5% level of statistical significance. *See* J. Stock, and M. Watson, Introduction to Econometrics, 4th Edition, 2019, Pearson, NY, at 75 for a general discussion.

[26] P. Gompers, J. Ishii, and A. Metrick, "Corporate Governance and Equity Prices," *The Quarterly Journal of Economics*, Vol. 118 (1), 2003 at 122. Gompers et al. (2003) implemented a factor asset pricing model.

[27] J. Stock, and M. Watson, Introduction to Econometrics, 4th Edition, 2019, Pearson, NY, at 185, ("A 95% confidence interval for the β_1 is an interval that contains the true value of β_1 with a 95% probability.").

[28] See Exhibit 3 and Ferrell Expert Report.

19. To demonstrate the robustness of my findings, the results in Exhibit 4 shows an analysis of my factor model using 7-day periods, and 30-day periods rather than the 28-day period. The results show that: [29]

(i) my original conclusion that the "XRP's long-run price return are associated with factors outside Ripple's control, namely, price returns of non-XRP cryptocurrencies" is still supported. For example, the coefficients on all four PCs are statistically significant at the 5% level when using 30-day periods for Estimation Period 2.

(ii) XRP price returns (after subtracting the risk-free rate) are not statistically significantly different than zero controlling for non-XRP cryptocurrency market factors. In each of the alternative specifications, none of the constants – which are estimates of the average 7-day, 28-day and 30-day periods XRP price return after subtracting the risk-free rate and controlling for non-XRP cryptocurrency factors – is statistically significant at the 5% level.

(iii) yet again, none of the [redacted] Excess Returns are within the 95% confidence interval of any of the alternative factor models.

20. Exhibit 5 shows the results when using Dr. [redacted] suggested cryptocurrency market factors or account growth he used in 18 out of his 20 models over Estimation Period

[29] These findings also apply when using 28-day frequency but without the THC return and separately, also when using only Coin Market Cap. I also do not find that alpha in the post-BitLicense period is statistically significant at the 5% level.

2.[30,31] As I show in Exhibit 5, none of the regression constants are statistically significant and positive over the long-term even when using Dr. [redacted] suggested factors.[32,33]

21. I conclude that the statistical evidence is inconsistent with the existence of the [redacted] Excess Returns generated from his but-for counterfactual prices.

[30] Dr. [redacted] Models 1 and 11 are not based on cryptocurrency market factors (or account growth). Model 1 is the Constant Mean Return Model and Model 11 is based on lagged XRP returns.

[31] I simply use Dr. [redacted] factors in a long-run regression analysis, but I am not necessarily endorsing Dr. [redacted] factors. The R-squared when using Dr. [redacted] factors is between 8.8% and 90.4%, which is lower than the 92.3% when using my factor model. *See, e.g.*, Ferrell Report, ¶ 98 and Footnote 175.

[32] The constant term represents the "remaining" average return, after accounting for the exposure to the non-XRP cryptocurrency market factors. *See, e.g.*, Ferrell Report, ¶ 96.

[33] These findings also apply when I implement Dr. [redacted] factors with a 7-day period and 30-day period.

I declare under penalty of perjury that the foregoing is true and correct.
Executed on May 13, 2022.

Frank Allen Ferrell

Exhibit 1
Ten Days with the Highest Purported Price Impact of Ripple News

Date	Actual XRP Return	Dr. [redacted] XRP Return	Actual XRP Price	Dr. [redacted] Counterfactual Price	Purported Price Impact of Ripple News
		[redacted] Non-Event Days			
12/29/17	54.5%	54.5%	$2.210	$0.014	$0.775
01/03/18	25.4%	25.4%	$3.110	$0.020	$0.626
01/18/18	22.1%	22.1%	$1.600	$0.010	$0.288
01/07/18	9.4%	9.4%	$3.380	$0.021	$0.288
12/27/17	17.6%	17.6%	$1.400	$0.009	$0.209
01/28/18	14.8%	14.8%	$1.400	$0.009	$0.179
12/31/17	6.5%	6.5%	$2.300	$0.014	$0.139
04/20/18	16.7%	16.7%	$0.925	$0.004	$0.132
01/17/18	11.0%	11.0%	$1.310	$0.008	$0.129
03/04/18	11.3%	11.3%	$1.010	$0.004	$0.102
		[redacted] Event Days			
12/21/17	53.4%	0.5%	$1.190	$0.007	$0.414
12/14/17	83.5%	0.0%	$0.864	$0.008	$0.393
02/09/18	18.5%	0.8%	$0.954	$0.005	$0.149
09/20/18	38.0%	-0.5%	$0.450	$0.001	$0.124
12/12/17	48.4%	0.0%	$0.374	$0.008	$0.122
02/10/18	12.1%	0.8%	$1.070	$0.005	$0.116
09/21/18	24.8%	-0.5%	$0.562	$0.001	$0.112
12/13/17	26.1%	0.0%	$0.471	$0.008	$0.098
02/08/18	11.2%	0.8%	$0.805	$0.005	$0.081
05/16/17	29.3%	1.8%	$0.350	$0.014	$0.079

Source: Backup to [redacted] Supplemental Report.

Notes:
1. Sorted from high to low.
2. Price Impact is defined as the difference between [XRP Price(t)-XRP Price(t-1)] and [Counterfactual Price(t)-Counterfactual Price(t-1)] for a given date t.

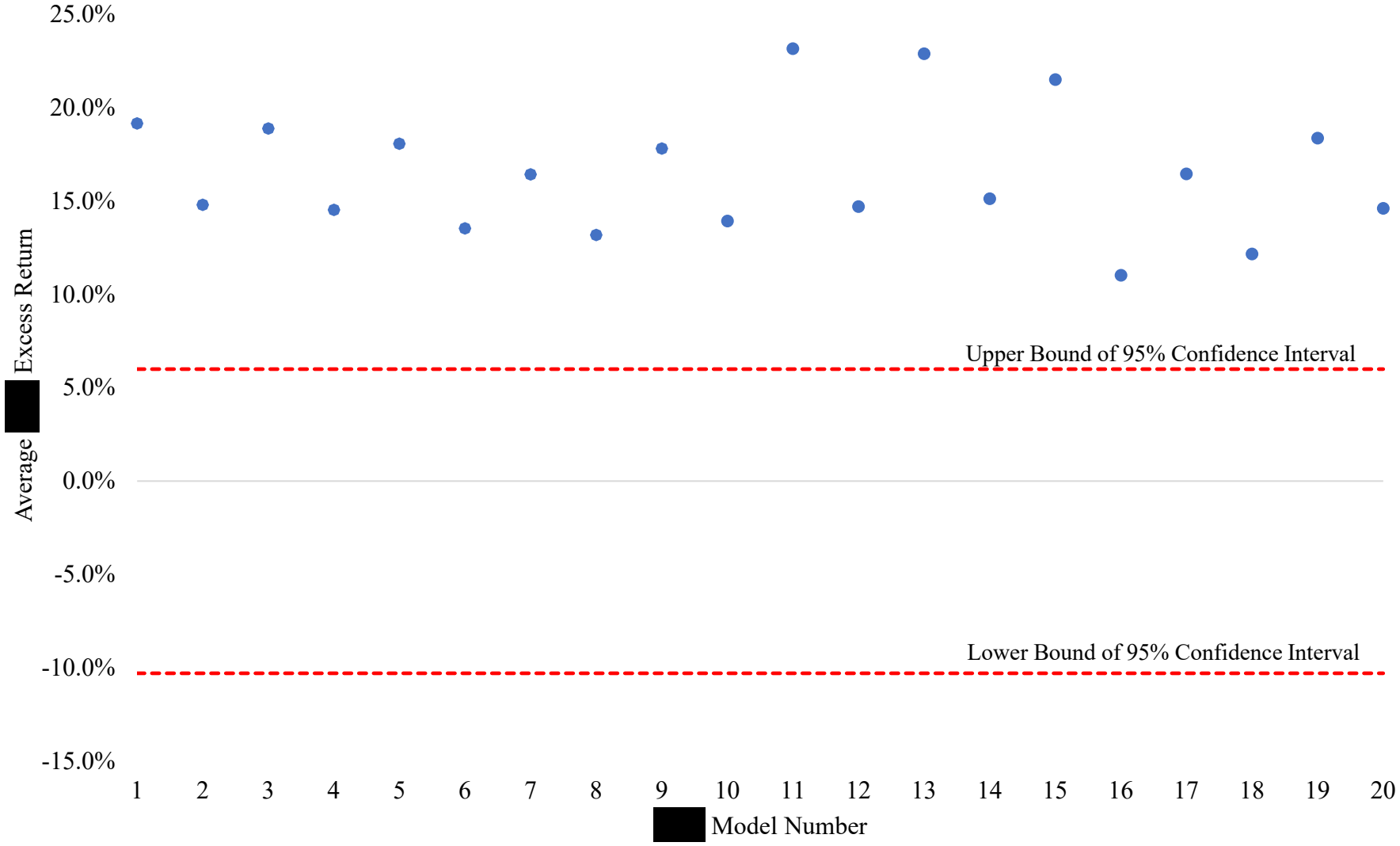
Exhibit 2
Regression of XRP Price Return on Principal Components of Other Cryptocurrencies

	Estimation Period 2 8/11/2015 - 12/20/2020
Constant	-0.022
	(0.041)
Principal Component 1	-0.001*
	(0.000)
Principal Component 2	-0.003*
	(0.001)
Principal Component 3	0.129*
	(0.004)
Principal Component 4	0.052*
	(0.008)
Principal Component 5	0.058*
	(0.012)
Principal Component 6	0.384*
	(0.031)
Principal Component 7	-0.149*
	(0.017)
Principal Component 8	-0.229*
	(0.028)
Principal Component 9	-0.041
	(0.036)
Principal Component 10	0.022
	(0.033)
Principal Component 11	-0.231*
	(0.045)
95% Confidence Interval around	[-10.3%, 6.0%]
Observations	70
Adjusted R-squared	0.923
Non-XRP Coins used in PCA	91

Sources: CryptoCompare; CoinMarketCap.

Notes:
[1] Standard errors, in parentheses, are robust to heteroskedasticity (Huber/White).
[2] * indicates statistical significance at the 5% level.
[3] All return variables are 28-day returns.
[4] The number of Principal Components are selected by the BIC criteria.

Exhibit 3
Average [redacted] Excess Return Falls Outside the 95% Confidence Interval
Estimation Period 2
(August 11, 2015 to December 20, 2020)



Source: Backup to [redacted] Supplemental Report., CoinMarketCap, CryptoCompare

Exhibit 4
Regression of XRP Returns on Principal Components of Other Cryptocurrencies For Alternative Sampling Frequencies
Estimation Period 2
(August 11, 2015 to December 20, 2020)

	28-Day Periods	7-Day Periods	30-Day Periods
Constant	-0.022	0.011	-0.014
	(0.041)	(0.011)	(0.036)
Principal Component 1	-0.001*	-0.000*	0.012*
	(0.000)	(0.000)	(0.000)
Principal Component 2	-0.003*	0.097*	0.228*
	(0.001)	(0.016)	(0.007)
Principal Component 3	0.129*	-0.029*	-0.037*
	(0.004)	(0.012)	(0.006)
Principal Component 4	0.052*	-0.011	-0.133*
	(0.008)	(0.018)	(0.022)
Principal Component 5	0.058*	-0.016	
	(0.012)	(0.015)	
Principal Component 6	0.384*	0.022	
	(0.031)	(0.017)	
Principal Component 7	-0.149*	0.030	
	(0.017)	(0.021)	
Principal Component 8	-0.229*	0.108*	
	(0.028)	(0.030)	
Principal Component 9	-0.041	0.019	
	(0.036)	(0.040)	
Principal Component 10	0.022	0.012	
	(0.033)	(0.039)	
Principal Component 11	-0.231*	-0.021	
	(0.045)	(0.047)	
Principal Component 12		0.068	
		(0.048)	
Principal Component 13		-0.032	
		(0.055)	
Principal Component 14		-0.019	
		(0.037)	
Principal Component 15		-0.331*	
		(0.151)	
95% Confidence Interval around Constant	[-10.3%, 6.0%]	[-1.1%, 3.3%]	[-8.6%, 5.7%]
Observations	70	280	66
Adjusted R-squared	0.923	0.365	0.946

Sources: CryptoCompare; CoinMarketCap.

Notes:
[1] Standard errors, in parentheses, are robust to heteroskedasticity (Huber/White).
[2] * indicates statistical significance at the 5% level.
[3] All return variables are returns over the period indicated in the column heading.
[4] The number of Principal Components are selected by the BIC criteria.

Exhibit 5
Regression of 28-Day XRP Return with Dr. [redacted] Cryptocurrency and Account Growth Factors for Estimation Period 2
(August 11, 2015 to December 20, 2020)

	Model 2	Model 3	Model 4	Model 5	Model 6	Model 7	Model 8	Model 9	Model 10	Model 12	Model 13	Model 14	Model 15	Model 16	Model 17	Model 18	Model 19	Model 20
Constant	-0.0635	0.1010	-0.1300	0.0878	-0.1279	0.0239	-0.0205	-0.0879	-0.0813	0.0424	0.0839	0.0097	0.0536	0.0089	-0.0242	-0.0020	-0.0500	-0.0846
	(0.1133)	(0.0892)	(0.0917)	(0.0873)	(0.1098)	(0.0566)	(0.0871)	(0.1056)	(0.0822)	(0.1935)	(0.1135)	(0.1659)	(0.1405)	(0.1694)	(0.0385)	(0.0686)	(0.0730)	(0.1500)
Number of Accounts Growth	7.8055		6.8020		6.9092		1.4782		-0.2462	10.7804		10.9899		11.1823		4.7931		2.2407
	(5.4115)		(5.0828)		(5.0905)		(3.6741)		(2.9377)	(7.9690)		(8.9044)		(8.8978)		(3.1900)		(6.0587)
BTC Return		1.5964	1.1447	1.4661	1.1946	0.1087	0.0868				1.3516	0.7671	1.6636	1.0598	0.0090	-0.1186		
		(0.8533)	(0.8301)	(0.7808)	(0.8072)	(0.3180)	(0.4661)				(0.7059)	(0.7327)	(0.9175)	(0.8134)	(0.2292)	(0.2669)		
ETH Return				0.1242	-0.0543	0.0284	-0.0073						-0.2575	-0.2610	0.0692	0.0306		
				(0.3355)	(0.4345)	(0.0843)	(0.1337)						(0.6294)	(0.5859)	(0.0953)	(0.1019)		
XLM Return						0.7703	0.7498								0.8595	0.7983		
						(0.0441)	(0.0710)								(0.1121)	(0.2407)		
Equal Weighted Index Return								2.2787	2.3008								2.3094	2.1624
								(1.2472)	(1.4592)								(1.3577)	(1.6084)
Lag XRP Return										0.0832	0.2273	0.0815	0.2826	0.1562	-0.3282	-0.2462	0.0663	0.0766
										(1.1459)	(1.1718)	(1.2649)	(1.1304)	(1.2396)	(0.3734)	(0.3883)	(0.8728)	(0.9121)
Lag Number of Accounts Growth										-6.1600		-5.4640		-6.7310		-4.1083		-0.0559
										(6.0150)		(4.8541)		(5.4497)		(4.0517)		(4.8725)
Lag BTC Return											-0.1898	-0.8458	-0.5778	-1.2808	-0.4323	-0.7206		
											(0.9433)	(0.7855)	(1.0631)	(0.9432)	(0.4967)	(0.5326)		
Lag ETH Return													0.3597	0.4346	0.4285	0.4849		
													(0.4550)	(0.3248)	(0.3827)	(0.3281)		
Lag XLM Return															0.2189	0.1414		
															(0.2961)	(0.3181)		
Lag Equal Return																	-0.3964	-0.6290
																	(1.1042)	(1.1617)
Adjusted R-squared	0.1717	0.0983	0.2038	0.0879	0.1923	0.8396	0.8420	0.5504	0.5438	0.2114	0.1170	0.2321	0.1224	0.2504	0.8739	0.9038	0.5447	0.5351

Sources: CoinMarketCap. Dr. [redacted] Supplemental Report Backup.

Notes:
[1] Standard errors, in parentheses, are robust to heteroskedasticity (Huber/White).
[2] * indicates statistical significance at the 5% level.
[3] All return variables are 28-day returns.

May, 2022

Appendix A

Allen Ferrell
Harvard Law School
Cambridge, Massachusetts 02138
Telephone: [redacted]
Email: [redacted]

CURRENT POSITIONS

Greenfield Professor of Securities Law, Harvard Law School

Visiting Professor, Stanford Law School

National Bureau of Economic Research, Research Associate

Member of Editorial Board, Journal of Financial Perspectives

Fellow, Columbia University's Program on the Law and Economics of Capital Markets

Faculty Associate, Kennedy School of Government

Research Associate, European Corporate Governance Institute

EDUCATION

Massachusetts Institute of Technology, Ph.D. in Economics, 2005
Fields in econometrics and finance

Harvard Law School, J.D., 1995, Magna Cum Laude
Recipient of the *Sears Prize* (award given to the two students with the highest grades)
Editor, *Harvard Law Review*

Brown University, B.A. and M.A., 1992, *Magna Cum Laude*

PREVIOUS POSITIONS

Harvard University Fellow
Harvard Law School, 1997

Law Clerk, Justice Anthony M. Kennedy
Supreme Court of the United States; 1996 Term

Law Clerk, Honorable Laurence H. Silberman
United States Court of Appeals for the District of Columbia; 1995 Term

COURSES TAUGHT

Contracts
Corporate Finance
Law and Finance
Securities Litigation & Regulation

REFEREE FOR FOLLOWING JOURNALS

American Law and Economics Review
Journal of Corporation Finance
Journal of Finance
Journal of Financial Perspectives
Journal of Law and Economics
Journal of Law, Economics and Organization
Journal of Legal Studies
Quarterly Journal of Economics

CONSULTING AREAS

Price Impact and Securities Damages, Valuation, Mergers & Acquisitions

Papers

"Are Star Law Firms Better Law Firms?" with Manconi, Neretina, Powley & Renneboog, Working Paper (2021)

"How Accurate are Matrix Bond Prices?" with Drew Roper & Yibai Shu, Working Paper (2018)

"New Special Study of the Securities Markets: Intermediaries" with John Morley in SECURITIES MARKET ISSUES FOR THE 21ST CENTURY (2018) (editors Fox, Glosten, Greene and Patel)

"Socially Responsible Firms," with Hao Liang and Luc Renneboog, 122 *Journal of Financial Economics* 586-606 (2016) (winner of Moskowitz Prize for outstanding quantitative research)

"Price Impact, Materiality, and *Halliburton II*" with Drew Roper, 93 *Washington University Law Review* 553 (2016)

"Introducing the CFGM Corporate Governance Database: Variable Construction and Comparison" with Cremers, Gompers and Andrew Metrick, Working Paper

"The Benefits and Costs of Indices in Empirical Corporate Governance Research," *in* OXFORD HANDBOOK ON CORPORATE LAW AND GOVERNANCE (2016)

"Thirty Years of Shareholder Rights and Stock Returns," with Martijn Cremers, *revise and resubmit Journal of Financial Economics*

"Thirty Years of Shareholder Rights and Firm Valuation," with Martijn Cremers, 69 *Journal of Finance* 1167 (2014)

"Rethinking *Basic*," with Lucian Bebchuk, 69 *Business Lawyer* 671 (2014)

"Calculating Damages in ERISA Litigation," with Atanu Saha, 1 *Journal of Financial Perspectives* 93 (2013)

"Forward-casting 10b-5 Damages: A Comparison to other Methods", with Atanu Saha, 37 *Journal of Corporation Law* 365 (2011)

"Event Study Analysis: Correctly Measuring the Dollar Impact of an Event" with Atanu Saha, Working Paper (2011)

"Legal and Economic Issues in Litigation arising from the 2007-2008 Credit Crisis," with Jennifer Bethel and Gang Hu, *in* PRUDENT LENDING RESTORED: SECURITIZATION AFTER THE MORTGAGE MELTDOWN (2009)

"Securities Litigation and the Housing Market Downturn," with Atanu Saha, 35 *Journal of Corporation Law* 97 (2009)

"The Supreme Court's 2005-2008 Securities Law Trio: *Dura Pharmaceuticals, Tellabs*, and *Stoneridge*," 9 *Engage* 32 (2009)

"What Matters in Corporate Governance?" with Lucian Bebchuk & Alma Cohen, 22 *Review of Financial Studies* 783 (2009)

"Do Exchanges, CCPs, and CSDs have Market Power?" *in* GOVERNANCE OF FINANCIAL MARKET INFRASTRUCTURE INSTITUTIONS (Ruben Lee) (2009)

"An Asymmetric Payoff-Based Explanation of IPO 'Underpricing'," Working Paper, with Atanu Saha (2008)

"The Law and Finance of Broker-Dealer Mark-Ups," commissioned study for NASD using proprietary database (2008)

"Majority Voting" *in* REPORT OF THE COMMITTEE ON CAPITAL MARKETS REGULATION (2008)

"The Loss Causation Requirement for Rule 10B-5 Causes of Action: The Implications of *Dura Pharmaceuticals v. Broudo*," with Atanu Saha, 63 BUSINESS LAWYER 163 (2007)

"Mandated Disclosure and Stock Returns: Evidence from the Over-the-Counter Market," 36 *Journal of Legal Studies* 1 (June, 2007)

"Policy Issues Raised by Structured Products," with Jennifer Bethel, *in* BROOKINGS –NOMURA PAPERS IN FINANCIAL SERVICES (2007)

"The Case for Mandatory Disclosure in Securities Regulation around the World," 2 *Brooklyn Journal of Business Law* 81 (2007)

"U.S. Securities Regulation in a World of Global Exchanges," with Reena Aggarwal and Jonathan Katz, *in* EXCHANGES: CHALLENGES AND IMPLICATIONS (2007)

"Shareholder Rights" *in* REPORT OF THE COMMITTEE ON CAPITAL MARKETS REGULATION (2007)

"Creditor Rights: A U.S. Perspective," 22 *Angler- und Glaubigerschutz bei Handelsgesellschaften* 49 (2006)

"Measuring the Effects of Mandated Disclosure," 1 *Berkeley Business Law Journal* 369 (2004)

"If We Understand the Mechanisms, Why Don't We Understand the Output?", 37 *Journal of Corporation Law* 503 (2003)

"Why European Takeover Law Matters," *in* REFORMING COMPANY AND TAKEOVER LAW IN EUROPE (2003)

"Does the Evidence Favor State Competition in Corporate Law?", with Alma Cohen & Lucian Bebchuk, 90 *California L. Rev.* 1775 (2002)

"Corporate Charitable Giving," with Victor Brudney, 69 *Univ. Of Chicago Law Review* 1191 (2002)

"A Comment on Electronic versus Floor-Based Securities Trading," *Journal of Institutional and Theoretical Economics* (Spring 2002)

"Much Ado About Order Flow," *Regulation Magazine* (Spring 2002)

"On Takeover Law and Regulatory Competition," with Lucian Bebchuk, 57 *Business Lawyer* 1047 (2002)

"Federal Intervention to Enhance Shareholder Choice," with Lucian Bebchuk, 87 *Virginia Law Review* 993 (2001)

"A New Approach to Regulatory Competition in Takeover Law," with Lucian Bebchuk, 87 *Virginia Law Review* 111 (2001)

"A Proposal for Solving the 'Payment for Order Flow' Problem," 74 *Southern California Law Review* 1027 (2001)

"Federalism and Takeover Law: The Race to Protect Managers from Takeovers," with Lucian Bebchuk, 99 *Columbia L. Rev.* 1168 (1999)

TESTIMONY LAST FOUR YEARS

SEC v. AT&T Inc. et al, 21 Civ. 1951, Expert report and deposition on April 15, 2022

Securitized Asset Funding 2011-2 v. CIBC, Case Index No. 653911/2015, Expert report and deposition on July 30, 2021 and trial testimony March 18 and 21, 2022

SEC v. Ripple, Case No.20-CV-10832, Expert report and deposition on February 23, 2022

Chabot et al. v. Walgreens, M.D. Pa 1:18-cv-02118, Expert report and deposition on January 18, 2022

EIG Energy Fund v. Keppel Offshore & Marine LTD, Case No.18-cv-01047-PGG, Expert report and deposition on December 9, 2021

Purple Mountain Trust v. Wells Fargo et al., Case No. 3:18-cv-03948-JD, Expert report and deposition on December 3, 2021

In re Robinhood Litigation, Case No. Case No. 3:20-cv-01626-JD, Expert reports and deposition on September 30, 2021

In re P3 Health Group Holdings, LLC, Case No. 2021-0518-JTL, Expert report and deposition on August 26, 2021

Pearlstein et al. v. Blackberry Limited, Case No. 1:13-cv-7060-CM, Expert report and deposition on November 3, 2020

In re Grupo Televisa Securities Litigation, Case No. 1:18-cv-01979-LLS, Expert report and deposition on February 21, 2020

In re Snap Securities Litigation, Case No. 2:17-cv-03679-SVW-AGR, Expert report and deposition on December 16, 2019

People of the State of New York v. Exxon Mobil Corporation, Index No. 452044/2018, Expert report and deposition on July 23, 2019 and trial testimony on November 6, 2019

In re Signet Jewelers Limited Securities Litigation, Case No. 1:16-cv-06728-CM, Expert report and deposition on May 14, 2019

Trustees of DALI et al. v. Barrick Gold Corporation, Case No. CV-14-502316-00CP, Ontario Superior Court of Justice, Expert reports and deposition on April 16, 2019

Ramirez v. Exxon Mobil Corporation et al., Case No. 3:16-cv-031110K, Expert report and deposition on March 22, 2019

CC IMA v. IMA Pizza, JAMS Ref No. 1425026556, Testimony on September 13, 2018

Bradley Cooper v. Thoratec Corporation et al., Case No. 4:14-cv-00360-CW, Expert report and deposition on April 11, 2018

Blattman v. C3, Inc. et al., Case No. 1:15-cv-00530-GMS, Expert report and deposition on December 22, 2017

United States v. Kaleil Tuzman, 15 Criminal Case No. 536 (US Attorney for the Southern District of New York), testimony on December 15 and 18, 2017

Appendix B

Materials Considered

Court Documents

First Amended Complaint, *Securities and Exchange Commission v. Ripple Labs, et al.*, No. 1:20-cv-10832 (S.D.N.Y. February 18, 2021)

Expert Reports

Expert Report of Allen F. Ferrell, Ph.D., October 4, 2021

Expert Report of [redacted] Ph.D., October 4, 2021

Rebuttal Expert Report of Allen F. Ferrell, Ph.D., November 12, 2021

Rebuttal Report of [redacted] Ph.D., November 12, 2021

Supplemental Report of [redacted] Ph.D., February 28, 2022

Depositions

Videotaped Deposition of [redacted] Ph.D., February 18, 2022

Academic Literature, Regulatory, and Practitioner Publications

Bebchuk, Lucian, Alma Cohen, and Charles C. Y. Wang, "Learning and the Disappearing Association Between Governance and Returns," *Journal of Financial Economics*, 108, 2013, pp. 323-348

Gompers, Paul, Joy Ishii, and Andrew Metrick, "Corporate Governance and Equity Prices," *The Quarterly Journal of Economics*, Vol. 118 (1), 2003, pp. 107-156

Stock, James H., and Mark W. Watson, Introduction to Econometrics, 4th Edition, 2019, Pearson, NY

Urquhart, Andrew, "The Inefficiency of Bitcoin," *Economic Letters* Vol. 148, 2016, pp. 80-82

Data Sources

Backup to the Supplemental Report of [redacted] Ph.D.
CoinMarketCap
CryptoCompare